DOCUMENT RESUME

ED 395 567 IR 017 879

AUTHOR Lee, In-Sook
TITLE Challenges to a Learning Approach through a Global Network.
PUB DATE Apr 96
NOTE 14p.; Paper presented at the Annual Conference of the American Educational Research Association (New York, NY, April 8-12, 1996).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Computer Networks; *Computer Uses in Education; Cooperative Learning; *Educational Development; *Educational Technology; Elementary Schools; Elementary Secondary Education; Foreign Countries; High Schools; Junior High Schools; Nontraditional Education; Private Schools; Problems; Public Schools
IDENTIFIERS *Korea; Korean Educational Development Institute

ABSTRACT

Computer networking is a new educational approach that can well serve the educational needs in a society of dynamic and constant changes. This paper examines effective ways of establishing a computer network-based learning system in the Korean educational system. The Korean Educational Development Institute (KEDI) conducted a one-year research project on educational computer networking with eight schools in Korea. Participants were four private schools (two elementary and two high schools) and four public schools (two junior high and two high schools.) Each school was challenged to collaborative learning activities under the support and coordination of KEDI. The project included teacher workshops; individualized instructional support; coordination and consultation activities; technical support; and field visits and interviews to observe and analyze the progress of the schools. Among others, findings indicated the following as having interrupted networking activities: (1) teachers' lack of understanding and experiences in a non-traditional learning approach; (2) incompetent computer-based networking skills; (3) lack of instructional materials and exemplary activities; (4) teachers' and students' insufficient ability in English; (5) limited access to computer networking facilities; (6) teachers' low motivation and spirit; (7) delayed or interrupted actions of participating schools; and (8) change of responsible teachers during the project. Successful computer networking in education requires: continuous education; technical support systems; consultation; organizational structures; and a positive culture in the school community. (Contains 24 references.) (AEF)

**********
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
**********

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION
CENTER (ERIC)
☐ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
In-Sook Lee
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

ED 395 567

# Challenges to a Learning Approach through a Global Network

## Abstract

Computer networking is a new educational approach fitting well educational needs in the society of dynamic and constant changes. That is, computer networking as an information bank, a cognitive tool, and a communication tool has significant potentials for student-centered, constructive learning environments. Computer networking, however, especially one through collaboration with distant learners is a complex business which requires well planned and considerate implementation. This research searches for effective and efficient ways of putting in a place a computer network-based learning system in Korean educational system. There are a number of core issues evolved from one year experiences in the computer networking project conducted by Korean Educational Development Institute. The issues can be summarized in five areas: (1) continuous education, (2) technical support systems, (3) consultation, (4) organizational structures, and (5) positive culture in a school community. Those elements for fully facilitating computer networking activities should work closely with interrelated and interconnected manners.

## I. Introduction

Information era demands members in the society more self-directed learning, information literacy, cultural literacy (understanding different cultures), effective communication, collaborative working, and creative and systemic problem solving. Increasing demand on those skills concurrently requires the existing uniform and teacher-centered education to transform toward constructive and student-centered on in which all educational arrangements are provided to strengthen each student's originality and potentiality. Rapid development of computer and information technology enables new approaches of developing individual creativity and encouraging self-directed learning.

Network-based communication rapidly emerges as an alternative of computer-based instruction as telecommunication technology develops and education becomes more globalized. Considering all those shifts and changes, the current research searches for effective and efficient ways of putting in a place a

IR017879

computer network-based learning system in Korean educational system. Korean Educational Development Institute (KEDI) has conducted an one year research project on educational computer networking with eight participating schools in Korea. Each school in this project has challenged to collaborative learning activities under the support and coordination of KEDI. KEDI supported them in various ways and observed and analyzed their practices to identify critical factors both promoting and hindering. Based on the findings, this research proposes comprehensive suggestions for promoting a successful design and implementation of a network-based collaborative learning project.

# II. Research Base for Study

**Educational values of computer network**

Computer network-based learning is one way of distance education in which learners at different locations can share ideas and information, search for various databases and instructional tools, and construct knowledge within the global learning community. Comparing to traditional face-to-face communication, it is more difficult to bring about dynamic and active interactions among users and it takes longer period of time to derive reactions in a computer networking environment. And novices in computer networking tend to hesitate using it. In spite of those drawbacks, computer networking has significant potentials as technology for student-centered, constructive learning environments:

**1. Computer network as an information bank.** Computer network allows users to access a broad spectrum of information and data on line at different locations (Morton & Mojkowski, 1991; Wagner & WcCombs, 1995; Levin, Rogers, Waugh, & Smith, 1989; Kemp, 1995; Means et al, 1993; Knapp & Glenn, 1996; Lee, in press). It also can provide a variety of learning tools necessary for on-line learning project. Some examples include guidances and background information for computer network-based learning as well as computer-based learning tools such as spreadsheets and utility softwares.

**2. Computer network as a cognitive tool**. Computer network supplies a learner-centered learning environment in which learners can lead their own learning process and proactively participate in it. Learner-centered learning environment allows learners to quest meanings and to construct their own knowledge from information and experiences, based on their original perceptions, thoughts, and emotions (McCombs et al., 1992). In addition, computer network demands learners to be both 'knowledge agents' and 'knowledge receiver' (Bruner, 1986). That is, it can provide a real world context where learners can collect and analyze data and produce learning outcomes for real audiences around the nation or the world .

**3. Computer network as a communication tool.** Computer network surpasses other telecommunication media for overcoming time and space limitation (Hezel & Dirr, 1990; Anderson, 1988; Shimabukuro, 1993). It promotes fast and easy communication among people at distance as well as fast and effective delivery of a large amount of information. Interactive learning through computer network is cost effective (Showalter, 1983): Experts don't need to travel and learners don't need to gather in specific places. Especially, an e-mail promotes communication among learners in the process of group tasks (Henri, 1988; Hiltz, 1988; Shimabukuro, 1993). Through an e-mail, conflicts in time schedules can be easily adjusted and geographically dispersed people can easily participate in a collaborative working.

Computer network provides socio-culturally diverse contexts and encourages "discourses" (Hicks, 1995) by supporting social interactions among people at different locations. Learning fosters through interaction and communication with people in a flexible and diverse environment of culture, ages, and family background (McCombs et al., 1992).

## III. Research Context and Process

**Participants**

KEDI has conducted a computer network-based learning project, with the collaboration of I*EARN since the beginning of 1995. Eight Korean schools were selected considering the following criteria:

1. accessibility to computer networking facilities and services
2. inclusion of schools from various locations
3. inclusion of both public and private schools
4. all school levels but kindergarten
5. availability of internal administrative and financial support
6. availability of extra curricular classes
7. availability of teachers team approach

Two private elementary, two public junior high, three public high (one regular, one business track), and two private high schools finally determined to participate in this project. (See table 1 for related information). Those schools are located in Seoul (4), Pohang (2), Junjoo (1), or Jaejoo (1).

Table 1. Participants

| Name | K high | Y high | S high | J High | I high | A Junior | E elem. | W elem. |
|---|---|---|---|---|---|---|---|---|
| No. of Students | 6 | 10 | 9 | 5 | 30 | 32 | 25 | 30 |
| Grade Level | 1-2 | 11 | 10-11 | 10, 12 | 10-11 | 7-9 | 5-6 | 5-6 |
| Nature of Activity | Extra-curricular | Extra-curricular | Extra-curricular | Extra-curricular | Extra-curricular | Extra-curricular | Extra-curricular | Extra-curricular |
| Name of Class | Computing | Science Inquiry | Computing | * Computing * Computer Networking | Computing | Global Community Research | Computing | Computer Networking |

**Research Process**

The project has been pursued with various activities as follows:

**Workshops.** Teachers workshops were provided two times. At the first workshop (24 February 1995) the participants learned basic knowledge and skills of the Internet, including how to use KEDI-Net, how to access to the Internet, and how to use several services available in the Net. They also met an I*EARN coordinator in Australia through a low scanning phone.

At the second workshop (25 August, 1995), the teachers were introduced to strategic models for computer network-based learning project and WWW. They accessed various educational web sites and learned HTML and WWW homepage setup in the server. In addition, two of the teachers who had attended the '95 I*EARN conference shared their experiences with the other colleagues.

**Individualized instructional support.** Besides the formal trainings, individual support has been provided as requested. Eight participating schools shared some identical needs but at the same time each school needed different levels and kinds of supports due to differences in their conditions. Especially, some teachers replacing their colleagues strongly needed individual instructions to obtain related information and skills. Retrospectively thinking, they were not provided this follow-up support mainly due to their hesitance in uncovering their needs for help.

**Coordination and consultation.** Various kinds of coordination have been provided from the outset of the project.

1. Supplying references and information: A reference booklet was provided, which is consisted of case studies on educational computer networking, information of various WWW sites, and basic HTML guides.

2. Opening the project WWW homepage on the KEDI-Net server (August, 1995): There were multiple purposes in opening its homepage. One was to inspirit the inert project: We expected that the teachers get more interested and motivated with currently the most exciting way of networking on the Net. Second was to promote more convenient and cost effective access to various Internet resources by establishing our own web sever. The participants won't need to use commercial network services anymore for WWW. Third purpose was to elevate school administers' interests and eventually make them more active supporters on the teachers' efforts. There was one episode showing an instant effect of the WWW homepage. Right after our homepage demonstration, a high school principal allowed his teacher to replace the old 2,400bps modem with 14,400 bps, which is a minimum speed for WWW.

3. Supporting community building: Sharing experiences and information among participants is critical to keep them involved. Emotional and spiritual connection built among participants will be a great help in pursuing a tough process like network-based collaborative activities. KEDI opened a group account, called "schools", for all the project participants to promote sharing ideas and concerns. This account mostly has been used for the KEDI coordinator to send out information and for the teachers to share their ideas or concerns. This account, however, appeared not fully utilized. We identified that most teachers felt themselves not doing well enough to ask for and share ideas.

4. Hosting a administers conference (24 August, 1995): This conference mainly intended to make the principals more aware of the current project and to build a common understanding within the participants. In addition, it was to stimulate teachers to reflect on their practices. In this meeting, each school addressed their project process and the KEDI research team also reported our practices and plans as well as demonstrated the WWW hompage.

5. Consulting on visioning and setting goal (July, 1995): In order to promote the project, I introduced the participants the need for visioning, setting goals, and scheduling. A basic framework for this was provided, however, not all the schools produced acceptable statements. It appeared that most of them have not yet understand what vision means.

6. Consulting on idea formulation (September, 1995): Through personal meetings and telephone talks, I tried to promote the teachers to select topics and formulate ideas for learning activities on line. Only one among eight teachers, however, bought into my consultation and put her efforts on planning learning activities. I questioned myself, "In spite of all my efforts, why few of them sincerely considered my suggestions?" First and foremost reason I can think of is that they were not enthused on the project. The teachers complained the principal's over requests or heavy work load with the regular teaching and administration duties.

7. Forwarding our correspondences from I*EARN: Some of the forwarded materials include information booklets, text-based publications of students projects, and e-mail messages. The teachers appeared not to pay much attention on these materials. Probably some teachers have not realized the benefits of I*EARN and some teachers simply had no extra time to review them.

8. Matching to partner schools: KEDI related the participating schools to their partner schools in USA or Canada with the collaboration of I*EARN when the project began. As a semester went, however, communication between them did not work well: In most cases, communication did not happen regularly or developmentally.

**Technical support.** Two Internet accounts on the KEDI-Net, one for teacher and one for students, have been provided each participating school with no charge. The KEDI-Net have delivered the Internet services of E-mail, FTP, USENET, Telnet, and WWW, Besides, two technical personnel have answered to questions on technical problems through the year.

**Field visit and interview.** The research team visited twice the participating schools and interviewed the teachers, students and administers. Those visits intended to observe the schools environment and to analyze progresses in the project, to discuss better ways to proceed the project. First visit was on 25 May through 5 June, 1995 and second one was 19 through 29 September, 1995. Main questions were formulated in the following categories:

1. technical, structural, administrative, instruction-learning, and cultural conditions in the schools
2. teachers' and students' readiness for networking, and frequency and purposes of using the Net
3. learning effects of the networking activities

# IV. Findings

Through various activities over one year, the research team observed and analyzed the context and process of those involved in the network-based educational activities. Accumulated information demonstrated several common features: **stagnation in the initiation phase,** lack of steady and progressive networking, and deep frustration and discouragement within all the participants including the research team. There was a tendency that access to the Net and exchange of pen-pal e-mails have been core activities of the project. As a result, frequency of e-mail exchanges proved to be the main concerns and functioned as the yardsticks of better educational computer networking activities. None of the schools began their project with specified goals, tasks, and outcomes. At the time of September, only two schools came to plan learning activities. Most of the teachers may have not realized that learning goals and activities should be prioritized over simple connection to the network.

The factual problems have resulted from interrelated and interconnected functions of various deep-root causes. Among others, the followings appeared to interrupt networking activities: (1) teachers' little understanding and experiences in a non-traditional learning approach, (2) incompetent computer based-networking skills, (3) lack of instructional materials and exemplary activities, (4) teachers' and students' insufficient ability in English, (5) limited access to computer networking facilities, (6) teachers' low motivation and spirit, (7) delayed or interrupted actions of participating schools, and (8) change of responsible teachers during the project.

**1. Teachers' little understanding and experiences in a non-traditional learning approach**

Activities on the Net require teachers a new mindset, skills, roles and responsibilities which are quite different from ones in the traditional classrooms. Among others, educational networking activities fit well and demand project-based, problem-based, and theme-based learning processes. Most teachers have few knowledge and experiences in those processes. The participating teachers have felt difficult even in finding out issues or topics interesting to both students and themselves. For those who were used to be a simple medium for delivering knowledge, it is surely a challenging task to undertake a new kind of roles and responsibilities.

**2. Incompetent computer based-networking skills**

Some of the teachers have not yet developed networking skills sufficient enough to manage their project as planned. During the interviews of May, only two teachers were confident with their networking skills. Three teachers perceived themselves as beginners and the other two needed an introductory training. There were possibly a couple of reasons why. Since their project has not run in a regular manner, the teachers had little opportunities to advance their computer networking skills. One true best learning method is "just doing". The participants in the worst condition were those who took the place of first designated teachers.

**3. Lack of instructional materials and exemplary activities**

Some teachers expressed needs for instructional materials to implement their ideas. A few materials are available depending on topics but written in English. Those do not fit well teachers' own purposes as they are or require extra efforts to adapt. And all the teachers have looked for any existing exemplary projects which might help them to design and implement their own networking activities. Like the pumpkin king of the Halloween town who visited the Christmas town but failed in feeling the nature and spirits of the Christmas season, the teachers have suffered from no schema of networking activities. Without visible and fully elaborated exemplary works, frustration and disillusions have been growing in those teachers.

**4. Teachers' and students' insufficient ability in English**

English as a main language on the Net appeared to be the most challenging and a long lasting issue to resolve before teachers and students can actively participate in computer networking activities. The teachers have consistently demonstrated difficulties with communicating on the Net. The students have shared the same problems as did their teachers. They needed quite time and efforts even to finish several lines of English sentences. In those conditions, it was not easy to make effective collaborations with English-speaking people. This should be the common problem of non-English speaking countries involved in the Net based activities.

Since the project launched, only two schools have accessed the I*EARN and yet the frequency of accessing have dramatically decreased. Originally the schools were expected to participate in the I*EARN activities. Many of the teachers, however, rather felt several tens of Listserv e-mails from I*EARN burdensome than informative. They have been ignored those e-mails and ended up with the breakdown of the mail system due to the piled up messages.

English as a communication language was pointed as the most significant roadblock against active participation in I*EARN. Reading and writing in a foreign language took a lot of efforts and time and eventually increased discouragement and frustration in the Korean participants. Computer based networking skills can be developed relatively in ease through training and experiences. Linguistic skills, however, don't easily advance in a given time. This is a critical problem for which various solutions should be considered: One possible solution is the use of translation softwares.

**5. Limited access to computer networking facilities**

One teacher complained, "Since means for networking have not been ready, there has been no time to think of learning activities." Most of the schools have acquired a minimum level of facilities. Two schools still use a multi-purpose phone line so that their networking activities have been frequently interrupted. Most of them have only one computer for networking and have limited access to the facilities due to tight school schedules and inconvenient locations. Considering all those obstacles, it was difficult that teachers and students have actively participated in networking activities. With insufficient quality and quantity of facilities, students could not developed competency in using the Net. Few students could exchange e-mails independently. In a worse school, the students have not yet learned how to use the Net. Mostly due to tight budget, most of the teachers preferred prohibiting individual students from using e-mail accounts. In most cases, teachers or student representatives have sent e-mail messages prepared by each student.

**6. Teachers' low motivation and spirit**

Majority of the teachers have been rather designated to the current position by the principal than volunteered. Those, with low motivation and spirit, tended not to put all their efforts on the project.

There is one episode well demonstrating this reality. After my first visit to the schools, I concluded that all the schools had no clear picture of what to do and what to achieve from this project. As part of my coordination, I suggested them to develop their visions, goals and short- and long-term strategic planning. None of them responded me over one month. They began to prepare the statements only after my notification that each school should share their visions and plans in the principle conference and that their statements would be attached on the Web homepage.

**7. Delayed or interrupted actions of participating schools**

Most of the schools have experienced interruptions of communication with partner schools. Slow progress of the project strongly resulted from delayed responses or no responses from partner schools and of course from the Korean participants. There might be several reasons of why this problem happened. Schools in different countries tend to have different semester schedules. Without knowing each others' schedules, communication can't be exchanged in an appropriate time. Emotional disturbance and frustration have grown in the participants. The Korean schools also have not reliable partners in terms of this matter.

**8. Change of responsible teachers during the project**

Teachers at four schools dropped out from the project due to either personal reasons or a regular transfer. Those changes, with no exception, have resulted in the interruption or dramatic discouragement of the project in the related schools. In addition, newly designated teachers have neither attained complete understanding of the project from their predecessors nor competencies required for leading networking activities.

## VI. Suggestions for a Successful Educational Commuter Networking

There are a number of core issues evolved from my one year experiences in the computer networking project conducted by KEDI. The issues can be summarized in five areas: (1) continuous education, (2) technical support systems, (3) consultation, (4) organizational structures, and (5) positive culture in a school community. Those elements for facilitating computer networking activities should work closely with interrelated and interconnected manners.

**1. Continuous education**

Computer network-based learning activities demand teachers knowledge, attitudes, and skills substantially different from the traditional school activities. In addition, each stage of activities tends to consist of different kinds of activities in which participants should take roles responding to those

changes. Accounting for those developmental and episodic features, education and training should be provided not only in a continuous manner but also in appropriate ways for each stage. Generally applicable contents for education are as follows:

a) understanding of various changes accompanied with computer network based learning process

b) skills for efficient use of computer network

c) skills for facilitating learners participation

d) knowledge and skills in theme-based learning

e) planning and managing a network-based program

In addition to formal education, reference materials should be provided, which include practical guidelines, related learning-instructional resources, and existing computer network-based learning programs.

**2. Technical support systems**

Appropriate numbers and types of hardwares and softwares are vital in facilitating educational computer networking activities. Technical supports are not only preconditional for launching computer network-based learning programs but also critical for conducting them without delay or interruption. The following technical supports are primary:

a) connection to network services which provide sufficient services for educational networking

b) appropriate quantity and quality of communication facilities including computers, modems and telephone lines

c) appropriate communication softwares

d) maintenance of communication equipment and programs

**3) Consultation**

There needs to be consultation in almost all aspects of educational networking activities, including visioning, selecting activities, planning and managing a project, facilitating students' activities, and many others. Besides, both teachers and students need help in using English for networking. Considering that linguistic skill is not easily advanced in a short time, structured and well planned assistance should be provided.

**4) Organizational structures**

Network-based learning demands a structural support which is very different from what the traditional, closed classroom learning does. Suggested core structures are as follows:

a) Collaborative structures among teachers

- structure or management which facilitates a theme-based and interdisciplinary learning within a school or between schools
- structure which ensures English teachers' support

b) Flexible and developmental approach in conducting a program

c) Structures which can fully utilize a variety of human resources such as parents, community members, or other volunteers

d) Administrative efforts on minimizing changes in responsible teachers

**5) Positive culture in a school community**

Due to its educational culture strongly focusing on "selecting and screening" rather than students' learning, there are substantial difficulties for schools to endeavor learning activities which are not directly beneficial to test scores or entrance examinations. Moreover, there has been public perception that computer networking activities take students time and therefore hinder students' academic achievement. To institutionalize this new learning method, schools should build in their school community a positive culture, based on understanding of educational advantages as well as limitations of computer networking.

## IV. Conclusions

Computer networking is a new educational approach fitting well educational needs in the society of dynamic and constant changes. It has a high educational potential by overcoming time and space limitation, facilitating learner-centered learning processes, connecting students to a wide variety of information sources outside the classroom, and promoting cultural comprehension and problem solving abilities through collaborative and collegial interactions. Computer networking, however, especially collaborative computer networking with distant learners is a complex business which requires well planned and considerate implementation. Meanwhile, this new technology has a potential power to restructure the current educational practices. The contents and processes in a networking tend to have very different natures from the current ones. Current roles of teachers as an information transmitter and providers can not be expected anymore. Time allotment or other factors also should be considered differently. A wide variety of needs for those changes require a long-term and progressive implementation process supported by teachers who understand the nature of networking process and have various knowledge and skills needed to lead network-based learning activities.

## References


Anderson, J.( 1988). Computer corner. *Australian Journal of Reading,* 11, 147-149.

Banathy, B.(1991). *Systems design of education: A journey to create the future*. Englewood Cliffs, NJ: Educational Technology.

Bruner, J.(1986). *Actual minds, possible worlds.* Cambridge: Harvard University Press.

Harris, J. B.(1995). Organizing and facilitating telecollaborative projects. *The Computing Teacher, 22*(5). http://www.ed.uiuc.edu/Guidelines/

Heinich, R., Molenda, M., & Russell, H. D.(1996). *Instructional media and the new technologies of instruction*(5th ed.). Englewood Cliffs, NJ: Prentice-Hall, Inc.

Henri, F.(1988). Distance education and computer-assisted communication, *Prospects,* 18, 85-90.

Hezel, R. T. & Dirr, P. J.(1990). *Understanding distance education: Identifying barriers to college attendance.* Commissioned by the Annenberg/Corporation for Public Broadcasting Project, Washington, DC. (ERIC Document Reproduction Service No. ED 340 335).

Hicks, D.(1995). Discourse, learning, and teaching. M. W. Apple(Ed.). *Review of Research in Education*, 21, 49-95. Washington D.C.: AERA

Hiltz, S. R.(1988, June). *Collaborative learning in a virtual classroom: Highlights of findings.* Paper presented at the Computer Supported Cooperative Work Conference. (ERIC Document Reproduction Service No. ED 305 895).

Jonassen, D. H., Campbell, J. P., & Davidson, N. E.(1993). Learning with media: Restructuring the debate. *Educational Technology Research and Development, 42*(2), 31-39.

Jonassen, H.(1995). Supporting communities of learner with technology: A vision for integrating technology with learning in schools. *Educational Technology, 35*(6), 60-63.

Kemp, J. E.(1995). *A school changes.* Washing D.C.: Association for Educational Communications and Technology.

Knapp, R., & Glenn, A.(1996). *Restructuring schools with technology*, Needham Heights, MA: Allyn & Bacon.

Lee, I-S.(1994). *Identifying stakeholders' values in the front-end of systemic school restructuring.* Unpublished doctoral dissertation, Indiana University.

Lee, I-S.(submitted). 신교육체제 기반으로서의 공학: 공학의 교육적 역할 재규명을 위한 연구 [Technology as the Core of A New Educational System : Redefining the Roles of Technology]. The Journal of Educational Research.

Lee, I-S, & Reigeluth, C. M.(1994). Empowering teachers for new roles in a new educational system. *Educational Technology, 34*(1), 61-72.

Levin, J. A., Rogers, A., Waugh, M., and Smith, K.(1989). Observations on educational electronic networks: The importance of appropriate activities for learning. *The Computing Teacher, 16*(8), 17-21. http://www.ed.uiuc.edu/guidelines/LRWS.html.

Lin, X., Bransford, J. D., Hmelo, C. E., Kantor, R. J., Hickey, D. T., Secules, T., Petrosino, A. J., Goldman, S. R., and the Cognition and Technology Group at Vanderbilt.(1995). Instructional design and development of learning communities: An invitation to a dialogue. *Educational Technology, 35*(5), 53-63.

McCombs, B. L. et al.(1992). *Leaner centered psychological principles: Guidelines for school redesign and reform.* Washington, DC: American Psychological Association and the Mid-continent Regional Educational Laboratory.

Means, B., Blando, J., Olson, K., Middleton, T., Morocoo, C., Remz, A., & Zorfass, J.(1993). *Using technology to support education reform.* Washington, D.C.: Association for Educational Communications and Technology.

Morton, C. & Mojkowski, C.(1991). *The place of global reality in interdisciplinary settings: Using modern technology to link classrooms for globalization.* (ERIC Document Reproduction Service No. ED 336 075).

Shimabukuro, J. N.(1993). Stimulating learning with electronic guest lecturing. *IPCT: an electronic journal for the 21st century, 1*(1), File: COTLAR IPCTV1N1.

Showalter, R. G.(1983, August). *Educational teleconferencing: Continuing professional education in speech-language pathology and audiology.* Paper presented at the Congress of the International Association of Logopaedics and Phoniatrics, Edinburgh, Scotland. (ERIC Document Reproduction Service No. ED 250 865).

Wagner, E. D., & McCombs, B. L.(1995). Learner centered psychological principles in practice: Designs for distance education. *Educational Technology, 35*(2), 32-35.